Consumers' Awareness towards Contaminated Peanut-Based Products in Terengganu

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DECLARATION

I hereby declare that the work embodied in this report is the result of my own research except for the excerpt as cited in the references.

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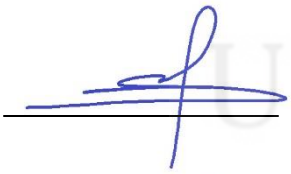

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Consumers' Awareness towards Contaminated Peanut-Based Products in Terengganu

ABSTRACT

In Malaysia, peanut consumption has been consumed as peanut candy, roasted peanut, unshelled peanut, and satay sauce. However, there are several cases that peanut-based products have been contaminated with Aflatoxin, Salmonella, and physical metal piece. There are a few incidences of contaminated peanut-based products that happened in Malaysia include in Terengganu. This issue happened due to the level of Aflatoxin in peanut-based products is exceeding the permitted limit by Malaysia Food Act 1983 and Regulation 1985. Thus, this study aims to determine the consumers' awareness of contaminated peanut-based products in Terengganu. The independent variables in this study are knowledge, attitude, subjective norm, and perceived behavioral control, while the dependent variable is consumers' awareness of contaminated peanut-based products. The quantitative research design was employed and the questionnaire was structured based on Theory Planned Behavior (TPB) and Knowledge, Attitudes, and Practice (KAP) Model. This study was applying a purposive sampling method that was involved 150 consumers in Terengganu. SPSS version 21.0 was be used to analyse the data using reliability analysis, descriptive analysis, normality analysis and Spearmen correlation. Based on the result of this study, the result for knowledge, attitude, and subjective norm have a high mean score, while consumer's awareness towards contaminated peanut-based product and perceived behavioral control have a medium mean score. Besides, this study also shows that all the variables had a significant relationship between attitude, subjective norm, and perceived behavioral control with consumers' awareness towards contaminated peanut-based products except the variable of knowledge was not significant. From this study, hopefully, the consumers have an increase in awareness and have a better understanding of the symptoms and effects of contaminated peanut-based products to prevent food-borne illness.

Keywords: *consumers' awareness, peanut-based product, Aflatoxin, Theory Planned Behavior (TPB), Knowledge, Attitudes, and Practice (KAP)*

Kesedaran Pengguna terhadap Produk Berasaskan Kacang Tanah Tercemar di Terengganu

ABSTRAK

Di Malaysia, penggunaan kacang tanah telah dimakan sebagai gula-gula kacang, kacang panggang, kacang tanah tanpa kulit, dan sos sate. Walau bagaimanapun, terdapat beberapa kes bahawa produk berasaskan kacang telah tercemar dengan Aflatoksin, Salmonella, dan kepingan logam fizikal. Terdapat beberapa kes tentang produk berasaskan kacang tanah tercemar yang berlaku di Malaysia termasuk di Terengganu. Isu ini berlaku berikutan tahap Aflatoksin dalam produk berasaskan kacang tanah melebihi had yang dibenarkan oleh Akta Makanan Malaysia 1983 dan Peraturan 1985. Justeru, kajian ini bertujuan untuk mengetahui kesedaran pengguna terhadap produk berasaskan kacang tanah yang tercemar di Terengganu. Pembolehubah tidak bersandar dalam kajian ini ialah pengetahuan, sikap, norma subjektif, dan kawalan tingkah laku yang ditanggap, manakala pembolehubah bersandar ialah kesedaran pengguna terhadap produk berasaskan kacang tanah yang tercemar. Reka bentuk kajian kuantitatif telah digunakan dan soal selidik telah distrukturkan berdasarkan Teori Tingkah Laku Terancang (TPB) dan Model Pengetahuan, Sikap dan Amalan (KAP). Kajian ini menggunakan kaedah persampelan bertujuan yang melibatkan 150 pengguna di Terengganu. SPSS versi 21.0 digunakan untuk menganalisis data yang menggunakan ujian kebolehpercayaan, ujian normaliti, analisis deskriptif, dan Spearmen korelasi. Berdasarkan hasil kajian ini, keputusan bagi sikap, dan norma subjektif dan pengetahuan mempunyai skor min yang tinggi, manakala kesedaran pengguna terhadap produk berasaskan kacang tanah tercemar, dan kawalan tingkah laku mempunyai skor min sederhana. Selain itu, kajian ini juga menunjukkan bahawa semua pembolehubah mempunyai hubungan yang signifikan antara sikap, norma subjektif, dan kawalan tingkah laku persepsi dengan kesedaran pengguna terhadap produk berasaskan kacang tanah yang tercemar kecuali pembolehubah pengetahuan tidak signifikan. Daripada kajian ini, diharapkan pengguna dapat meningkatkan kesedaran dan lebih memahami gejala dan kesan produk berasaskan kacang tanah yang tercemar bagi mengelakkan penyakit bawaan makanan.

***Kata kunci**: kesedaran pengguna, produk berasaskan kacang tanah, Aflatoksin, Tingkah Laku Terancang Teori (TPB), Pengetahuan, Sikap dan Amalan (KAP)*

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CHAPTER 1

INTRODUCTION

1.0 Introduction

In this chapter, the background study of consumers' awareness towards the contaminated peanut-based product in Terengganu contains the background of research, the problem statement of research, hypothesis, research question, the scope of the study, the significance of the study, and research objective.

1.1 Background of Research

Peanut or a scientific name called *Arachis hypogaea* is among the most major staple legumes in the world due to its high nutritional value, taste, and accessibility (Toomer, 2018). Around 80% of the world's peanut production comes from rain-fed semiarid tropics, where yields are generally low and variable due to irregular water deficiency and high temperatures (Rachaputi, Chauhan, and Wright, 2021). Peanuts can be consumed as a raw and wide range of peanut-based products all over the world. Peanuts are rich in protein, vitamins, mineral, fibre and also contains 20 amino acids which is the biggest source of protein namely 'arginine' (Salve and Arya, 2021).

1.1.1 Global Peanut Production

Peanuts are the most important crops which is can supply food around the world and China is the largest supplier of peanuts to the global market (Chen, Gao, and Butts, 2017). According to International Nut and Dried Fruit Council Foundation (INC) (2018), global peanut production continued to rise over the 2018/2019 season (INC, 2018). However, global peanut production during the 2019/2020 season had a slight decrease from the previous season, resulting from approximately 41.4 million metric tons of in-shell basis (INC, 2019). Figure 1.1 shows that China led the way in peanut production, with a crop that was 4% higher than the previous year, followed by India, whose crop was 32% higher than in the 2018/2019 season. Other than that, the top countries producing–peanuts are Nigeria, Senegal, and Argentina decreased between 21% and 24% from the previous year, while the United States of America (USA) remained unchanged (INC, 2019).

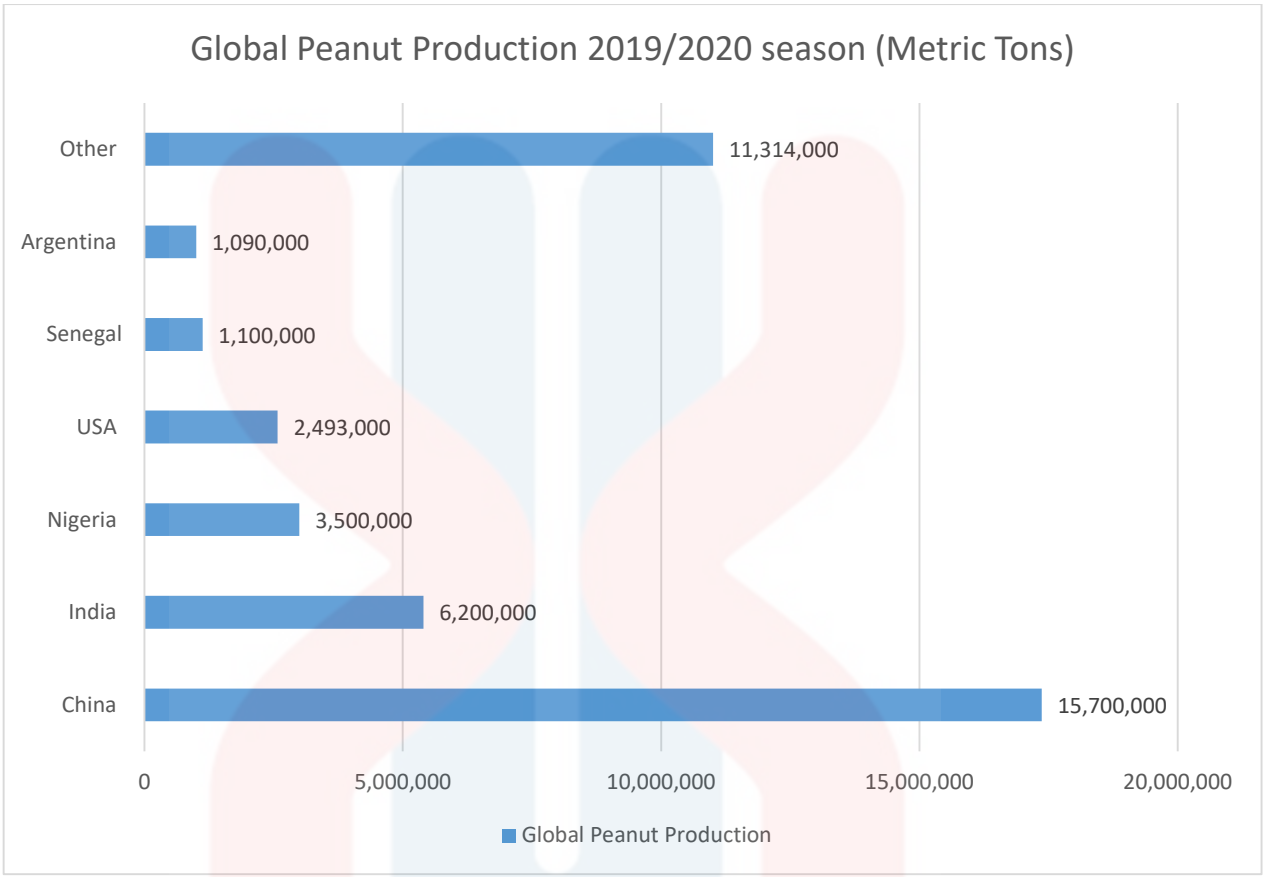

Figure 1.1: Global Peanut Production

Source: International Nut and Dried Fruit Council Foundation (INC), (2019)

1.1.2 Global Peanut Consumption

Peanuts contain high in protein and energy which is can be used for all consumers around the world and the nutrition from a peanut can meet the nutritional needs especially for developing countries (Toomer, 2018). The significance of peanuts can contribute to a heart-healthy diet and has caught the interest of consumers. The consumption of peanuts also can be done as ready-to-use therapeutic food (RUTF) and can be one of the mechanisms for treating malnutrition among children (Verma, Mahatma, Singh, and Radhakrishnan, 2020). An example of a RUTF product for peanuts is Plumpy' Nut which is a peanut-based product that contains a few nutritious ingredients to consumers especially for malnutrition children such as vitamins, milk powder, and minerals (Tran, Lee, Petnic, Bozzini, and Lu, 2020).

Although Malaysia is not major in the production of peanuts, the consumption of peanuts among consumers in Malaysia was listed as the highest global peanut consumption (INC, 2019). Usually, consumers in Malaysia consume peanuts whether roasted, grilled, fried, or boiled (Mohd Azaman, Kamarulzaman, Shamsudin, and Selamat, 2016). Based on data provided in Table 1.1, Malaysia has listed in the top 20 the highest world consumption of peanut.

Table 1.1: World Peanut Consumption

Country/Year	Consumption In Metric Tons (MT)				
	2014	2015	2016	2017	2018
China	16,636,003	16,682,808	17,371,242	19,173,504	14,934,656
India	4,247,948	4,093,543	5,627,940	5,945,293	4,683,487
Nigeria	2,999,992	3,000,000	3,000,025	3,218,740	3,806,972
USA	2,213,880	2,614,629	2,313,684	2,348,027	2,296,667
Indonesia	1,367,024	1,324,925	1,310,520	1,364,007	1,189,344
Vietnam	648,599	574,994	669,618	669,526	575,343
Brazil	287,614	348,459	329,803	360,591	269,349
Germany	82,574	97,628	92,375	161,501	170,409
Mexico	212,601	220,761	203,355	247,422	158,115
Russian Fed.	70,986	64,432	77,653	127,776	123,711
UK	68,396	70,334	85,099	83,417	100,856
Canada	87,543	91,485	95,797	107,642	99,424
Poland	28,276	22,772	46,257	66,597	75,408
Philippines	70,390	62,357	61,106	87,329	70,668
Algeria	40,354	33,027	50,698	51,565	49,760
Thailand	36,192	69,462	74,742	23,698	45,431
Malaysia	**72,182**	**84,985**	**71,494**	**51,508**	**38,457**
Japan	29,070	26,016	29,302	47,479	38,049
France	16,871	16,204	25,911	33,532	33,709
South Africa	78,697	35,946	136,168	82,153	26,886
WORLD TOTAL	**39,144,000**	**41,701,000**	**42,596,00**	**44,221,000**	**42,213,000**

Source: International Nut and Dried Fruit Council Foundation (INC), (2019)

1.1.3 Food Contamination

Food contamination is generally defined as foods that have spoiled or become tainted due to the presence of microorganisms, such as bacteria, parasites, and toxins that cause food-borne illness to the consumers (Abebe, 2020). Generally, food contaminations are divided into three groups which are biological, chemical, and physical contamination (Santacruz, 2016).

Biological contamination refers to food that has been contaminated by organisms such as bacteria, viruses, yeasts, moulds, and parasites (Schweihofer, 2013). Examples of biological contamination are *Salmonella, E. coli, and Clostridium botulinum*. Biological contamination has the potential to produce toxins and this can lead to serious of consumers' health (Ortiz, 2020). Next, chemical contamination occurs due to the improper application of pesticides or antimicrobial residues (Indiarto and Rezaharsamto, 2020). Chemical contamination also occurs due to chemicals used in manufacturing processes such as using high concentrations in sodium nitrite or antimicrobial solutions. Physical contamination includes hard or sharp objects such as glass, metal, plastic, stones, wood, or even bone (Lavkor and Var, 2017). The effects of physical contamination can gives injuries to the consumers such as choking and broken teeth.

In peanut-based products, there are have two types of contaminations which are biological and physical (Hassan, Kamarulzaman, and Nawi, 2018). Examples of biological contamination are Aflatoxin and Salmonella. The physical contamination is due to the presence of a foreign object which is possible metals pieces. There a few incidences of peanut contamination occurred in Malaysia due to Aflatoxin which is the toxin that is released from

peanut is exceeding the permitted limit by Malaysia Food Act 1983 and Regulation 1985. Research stated that about 78.57% of the total samples randomly collected from Malaysian supermarkets have been contaminated with Aflatoxin which is more than 10% exceeded the permitted limit of 15 ng/g set by the Codex (Arzandeh, Selamat, and Lioe, 2010). These issues happened in the state of Malaysia which are Terengganu, Perak, and Penang (Hong, Yusof, and Ling, 2010).

a. Aflatoxin

Aflatoxin is the most poisonous mycotoxin that is produced by certain moulds including *Aspergillus flavus* and *Aspergillus parasiticus* (Shephard, 2018). These moulds usually grow in soil, decaying vegetation, hay, and grains. The toxin that produces from the moulds which are Aflatoxin occurs during the production, harvesting, storage, and processing of food (Dhakal and Sbar, 2020). Examples of crops that are usually affected by Aflatoxin are cereals oilseeds, spices, and tree nuts (Sani and Sheikhzadeh, 2017).

Aflatoxins come in a variety of forms such as Aflatoxin B1 (AFB1) and Aflatoxin B2 (AFB2), the most dangerous of all aflatoxins is AFB1 (Chandra, 2021). According to the Food and Drug Administration (FDA) of the United States, Aflatoxin is considered to be an unavoidable food contaminant. Aflatoxin contamination can cause nausea, vomiting, abdominal pain, convulsions, and other symptoms of acute liver injury (Wang, Lien, and Ling, 2018). Munkvold, Arias, Taschl, and Gruber-Dorninger (2019) stated that the sign of acute Aflatoxicosis is depression, nervousness, and diarrhoea.

b. Salmonella

Peanuts have been identified as a potential source of Salmonella transmission due to recent food-borne outbreaks (Nascimento, Carminati, Morishita, Amorim Neto, Pinheiro, and Maia, 2018). There are issues of Salmonella contamination in California and it has affected nine people in the North due to consumption of contaminated peanut butter (Centers for Disease Control and Prevention (CDC), 2015). Salmonella is infected on raw peanuts during production, harvesting, storage, processing, and packaging (Brar and Danyluk, 2018). This happened due to non-hygienic practices during the food handling process. Next, Salmonella contamination can cause a variety of diseases, and infection can be acute or chronic such as abdominal pain, diarrhoea, nausea, and vomiting. (Kurtz, Goggins, and McLachlan, 2017).

c. Possible Metal Pieces

Possible metal pieces are categories as physical contamination due to non-hygienic during the food handling process (Schweihofer, 2013). There is an issue that has been reported by the Ministry of Health Malaysia (MOH) about possible metal pieces contamination in the peanut-based product which is SKIPPY Reduced Fat Creamy Peanut Butter Spread that contains metal shaving (Ministry of Health Malaysia (MOH) and Food Safety Information System of Malaysia (FoSIM), 2015). According to U.S Food and Drug Administration (USFDA), there is metal shaving contained in a batch product of 16.3 ounces per jar, "Best If Used By" DEC1416LR1 with UPC code in the packaging of the product is

37600-10500. This batch was distributed to seven states in United State (US) include Georgia, Virginia, Alabama, North Carolina, South Carolina, Delaware, and Arkansas.

1.2 Problem Statement

The consumption of peanuts is high among consumers in Malaysia even though Malaysia is not the main producer of peanuts (INC, 2019). Unfortunately, peanuts are easier exposed to contamination by mutagens that are produced from moulds specifically, *Aspergillus flavus* and *Aspergillus parasiticus* (Shephard, 2018). These moulds resulted in the release of a toxin called Aflatoxins. These toxins are poisonous and cancer-causing agents due to improper storage. Aflatoxin contamination also can cause serious health effects to humans including liver cancer (Saha Turna and Wu, 2019). Other common effects due to Aflatoxin contamination are vomiting, diarrhoea, and convulsion (Kurtz, Goggins, and McLachlan, 2017). Other than Aflatoxin contamination, Salmonella contamination and possible metal pieces contamination also occurs in peanut-based products. The occurring of Salmonella in peanut products is due to exhibiting a low water activity (aw) and high-fat content, which result in increasing the thermal resistance and ability to survive of Salmonella (Nascimento et al., 2018). Other than that, possible metal pieces are physical contamination in the peanut-based product. There is an issue that has-been reported by the Ministry of Health Malaysia (MOH) in presence of metal shaving in SKIPPY Reduced Fat Creamy Peanut Butter (MOH, 2015). This physical contamination is dangerous for consumers' safety and health.

Unluckily, there are a few issues due to contamination in peanut-based products and foodborne diseases from Aflatoxin contamination have been reported in Malaysia (Norlia, Jinap, Nor-Khaizura, Son, and Chin, 2018). For example, the issue of Aflatoxin contamination in the peanut-based product in Kuala Terengganu was reported that Aflatoxin has exceeded the permitted limit set by Malaysian standard (Hong et al., 2010). However, there is a low of awareness toward contaminated peanut-based products due to limited knowledge about contaminated food among consumers (Sanou, Liverpool-Tasie, Caputo, and Kerr, 2021). A previous study, also agreed that consumers' awareness of food contamination was low (Bolek, 2020; Hassan, et al., 2018)

Hence this study aims to determine the consumers' awareness towards contaminated peanut-based products in Terengganu based on the Theory of Planned Behaviour (TPB) and Knowledge, Attitudes, and Practice (KAP) model. In the future, this study hopefully will give benefits to the consumers, food industry, and government to have a better specific knowledge of symptoms and awareness towards the contaminated peanut-based product.

1.3 Hypothesis of the Study

H_1: There is a significant relationship between attitude with consumers' awareness towards contaminated peanut-based products.

H_2: There is a significant relationship between subjective norm with consumers' awareness towards contaminated peanut-based products.

H_3: There is a significant relationship between perceived behavioral control with consumers' awareness of contaminated peanut-based products.

H_4: There is a significant relationship between knowledge with consumers' awareness towards contaminated peanut-based products.

1.4 Research Questions

1. What is the level of consumers' awareness towards contaminated peanut-based products in Terengganu?
2. What is the level of knowledge, attitudes, subjective norm, and perceived behavioral control of consumers' awareness towards contaminated peanut-based products in Terengganu?
3. There is any relationship between knowledge, attitudes, subjective norm, and perceived behavioral control with consumers' awareness towards contaminated peanut-based products in Terengganu?

1.5 Scope of Study

In this study, consumers' awareness of contaminated peanut-based products is the focus of this study. While the independent variables are knowledge, attitude, subjective norm, and perceived behavioral control. Due to the issues of Aflatoxin contamination level being exceeded in the peanut-based products in Terengganu, this state will be chosen as targeted respondents and population. The total target respondents are 150 consumers in Terengganu.

1.6 Significance of Study

This study will give benefits to the consumers about the awareness of the contaminated peanut-based product. Usually, consumers are aware of the food poisoning that occurs in their daily meals due to food spoilage. However, this study focus on food contamination that occurs in peanut-based products due to contaminations from Aflatoxin, Salmonella, and possible metal pieces. This study also gives more information to the consumers about the symptoms and effects of the contaminated peanut-based product.

Next, this study also gives benefits to the industry of food such as producers, manufacturers, and marketers to have a better understanding and awareness more about

contaminated the peanut-based product. They also can improve more in food hygiene practices during processing the products to prevent contamination.

Furthermore, this study also can contribute important information to the government which is policymakers such as National Agrofood Policy 2.0 (NAP 2.0) in line with Industrial Revolution 4.0 (IR4.0) and Sustainable Development Goals (SDGs) 2030 as a guideline to provide a better policy formulation in term of reducing the risk of contaminated in peanut-based products.

1.7 Objective of the Study

The specific objective of this study:

1. To determine the level of consumers' awareness towards contaminated peanut-based products in Terengganu.
2. Identify the level of knowledge, attitudes, subjective norm, and perceived behavioural control of consumers' awareness towards contaminated peanut-based products in Terengganu.
3. Analyse the relationship between knowledge, attitudes, subjective norm, and perceived behavioural control on consumers' awareness towards contaminated peanut-based products in Terengganu.

CHAPTER 2

LITERATURE REVIEW

2.1 Concept of Consumers' Awareness towards Contaminated Peanut-Based Products

Awareness can be defined as the knowledge and understanding that something is happening or exists (Sarter and Woods, 1991). Ramli, Sapawi, Noor, and Zahari (2020) concluded that the most crucial step in preventing food contamination is to have a high level of awareness. The issues from food contamination including peanut contamination critical issues for global public health because these issues can lead to foodborne illness (Mupunga, Mngqawa, and Katerere, 2017). There are two types of contamination in peanut-based products including biological and physical (Hassan et al. 2018). Aflatoxin and Salmonella are two examples of biological contamination. The physical contamination is caused by the presence of a foreign object, which could be metal pieces.

A study by Bolek (2020), concluded that consumers' awareness of food contamination has a low mean score (M=2.33) due to a lack of awareness about the issue related to food contamination. According to research from Soon (2018), consumers have a low level of awareness related to contaminated peanut-based products and are not aware of food contamination symptoms and their effects. Based on the research from Hassan et al. (2018), they found that the level of awareness among consumers has a low mean score towards food contamination.

2.1 Theoretical Framework

One of the most important aspects of the research process is the theoretical framework, which included the theories expressed to analyse the data and interpret the results (Kivunja, 2018). The theoretical framework is the structure that can assist or support a research study's theory. In this study, the theoretical frameworks that will be used are the Theory of Planned Behaviour (TPB) and the Knowledge, Attitude, Practices (KAP) Model.

2.1.1 Theory of Planned Behaviour (TPB)

Theory of Planned Behaviour (TPB) by Ajzen 1991 pointed out that attitude, subjective norm, and perceived behavioral control was the predictor of human behaviour. TPB was a critical framework for identifying and explaining behavior across a wide range of domains (Steinmetz, Knappstein, Ajzen, Schmidt, and Kabst, 2016). According to Ajzen (2017), there was an extension of TPB that included background factors such as individual, social, and informational factors that influence behavioral beliefs, normative beliefs, and control beliefs. The adaptation of these new background factors discovered that it can predict behaviour of consumers towards contaminated peanut-based products. A study by Harris, Ali, and Ryu (2018) was used the theory of planned behaviour (TPB) to determine attitude, subjective norm, and perceived behavioral control from the research of consumers' awareness towards foodborne illness.

Attitude is the first element which is referred to as the degree to which the individual has a favourable or unfavourable evaluation or estimation of some issues' behaviour (Conner, 2020). The attitude of consumers with the rise in awareness enhances the level of awareness towards contaminated peanut-based products, from that consumers will purchase the peanut-based products without any doubt (Hassan et al. 2018).

Subjective norm is a predictor that refers to an individual's belief of the social pressure that approves or disapproves of the behaviour (Ajzen 1991; Park 2000). It is also defined as the individual's perception of other people's perspectives and thoughts on the suggested behavior. Other than that, subjective norms of an individual influence his or her perception about the thoughts on the behaviour such as family members, friends, colleagues, etc. These perceptions can have an impact and put pressure on an individual to perform a specific behavior, such as being aware of contaminated peanut-based products (Odeyemi, Sani, Obadina, Saba, Bamidele, Abughoush, and Aberoumand, 2019).

Perceived behaviour control refers to a person's perception of the ease or difficulty of carrying out the desired behaviour (Ajzen, 1991). It means that behavioral control refers to how easy or difficult it is to perform a specific behavior or consume a specific product. Consumption of a peanut-based product is also influenced by perceived behavioral control (Scalco, Noventa, Sartori, and Ceschi, 2017).

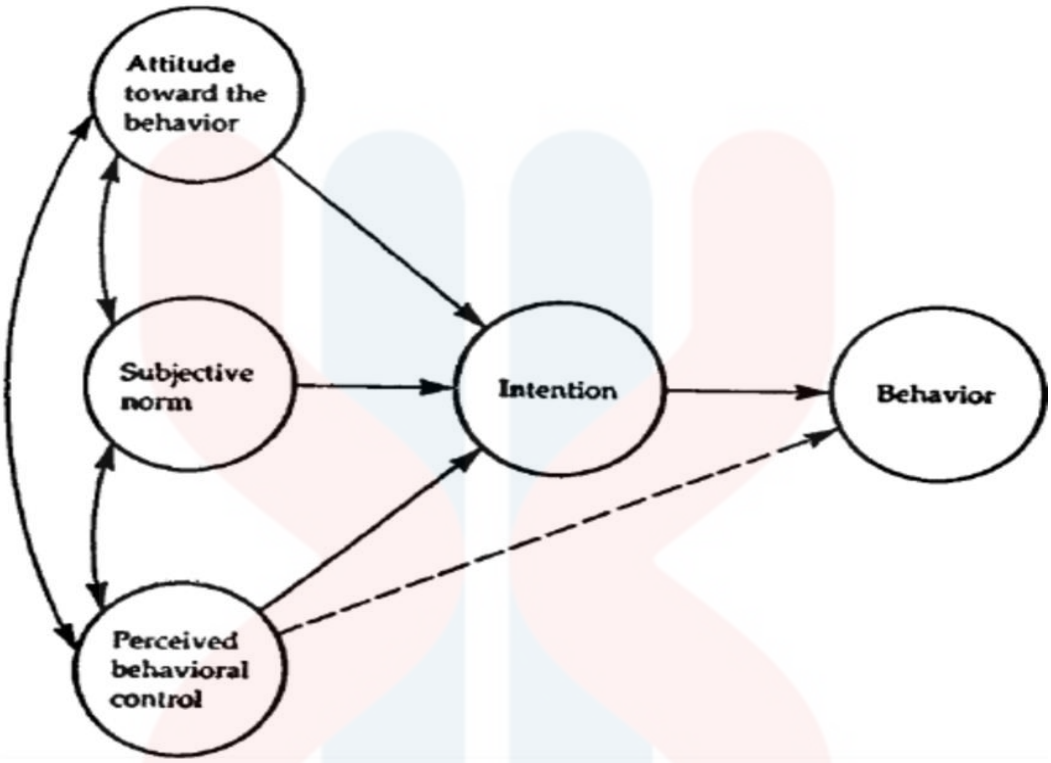

Figure 2.1: Theory of Planned Behavior (TPB) (Source: Ajzen, 1991)

2.1.2 Knowledge, Attitude, Practices (KAP) Model

The knowledge, attitude, and practice (KAP) model are used to collect information from the target population on what is known (knowledge), believed (attitude), done about a specific topic (practice), and this model is most commonly used to study tool in health-seeking behavior research (Kwol, Eluwol, Avci, and Lasisi, 2020). A study by Zhao, Yu, Xiao, Cai, Luo, and Zhang (2020), was used KAP model. Their study focused on determining netizens' food safety and they used elements of knowledge and attitude in their research.

Knowledge is usually assessed to see how far consumers are aware and corresponds to contaminated peanut-based products (Odeyemi et al. 2019). Tannahill (2008), stated typical questions from knowledge are about causes, symptoms, effects, and related issues of the contaminated peanut-based product. The term "attitude" refers to a consumer's belief about the bad effects when consuming contaminated peanut-based products and practice refers to the ways how the food industry and manufacturer handle hygienic practices in peanut-based products (Mohd Azaman et al. 2010).

From this study, knowledge and attitude will choose as the theoretical framework to support a research study's theory. This study is focused on consumers' awareness towards contaminated-peanut-based products, therefore, practice is not chosen as a theoretical framework because the practices element is focused on manufacturer or stakeholder's hygienic practices during handling the peanut-based products. Figure 2.2 below shows diagram of KAP model that adopted by Schwartz (1976).

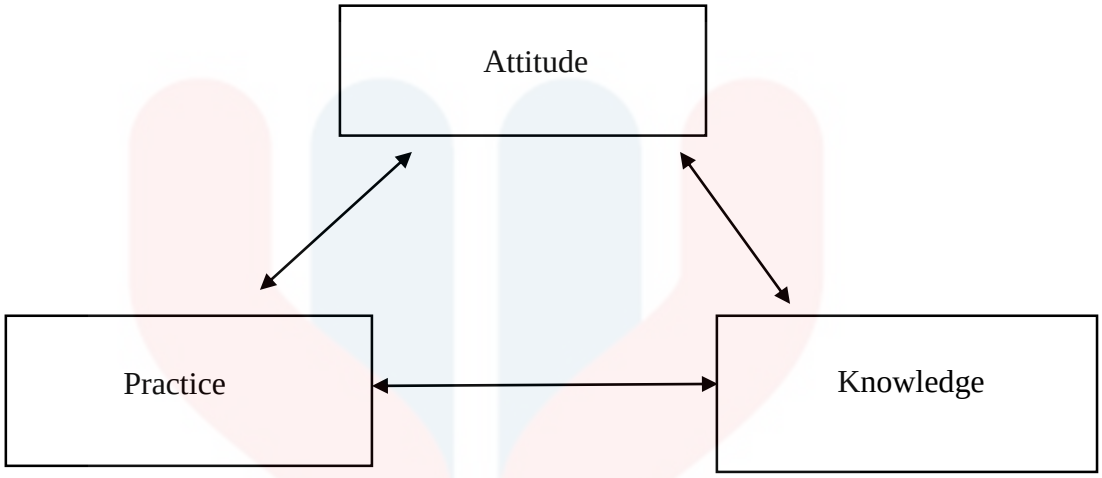

Figure 2.2: Knowledge, Attitude, Practice (KAP) Model (Source: Schwartz, 1976)

2.2 Factor explaining Consumers' Awareness towards Contaminated Peanut-Based Products

This section explained knowledge, attitude, subjective norm, and perceived behavioral control as the factors that can influence the consumers' awareness towards contaminated peanut-based products.

2.2.1 Knowledge

Knowledge can be defined as an individual's understanding of information about a subject gained through experience or study (Lortie, Desmarais, and Laroche, 2012). A study from Soon (2018), stated that the level of knowledge among consumers towards food contamination is low due to a lack of knowledge and awareness towards the symptoms and effects when consuming contaminated peanut-based products. This is because consumers are taken for granted and unaware of contaminated peanut-based products. Consumers need to know that peanuts are easily exposed to contaminations such as Aflatoxin, Salmonella, and possible metal piece (Norlia et al, 2018). These contaminations can give bad effects on the human body. Therefore, knowledge is the factor that can influence the awareness of consumers towards contaminated peanut-based products.

Sanlier and Baser (2020), stated that the action of consumers to gain knowledge by being aware of the issue related to contaminated peanut-based products. For example, issues of contamination in the peanut-based product occur due to two common contaminations which are physical contamination such as containing metal shaving in peanut-based products, and biological contamination which are Aflatoxin and Salmonella (Santacruz, 2016). These contaminations need to be aware because can give acute or chronic disease to the consumers (Wang, Lien, and Ling, 2018).

In their study, Leong, Ismail, Latiff, Nurul Izzah, Narazah, and Nurul Ain (2018), stated that there was a low level of knowledge about aflatoxin which is only 5% have adequate knowledge about aflatoxins. Agreed by Mohd Azaman et al. (2015), most of their respondents have inadequate knowledge about aflatoxin contamination can occur in peanut-based products. Their study shows that respondents have inadequate knowledge about aflatoxin contamination in the peanut-based product due to level of awareness towards contamination of peanut-based products is low. A study from Hassan et al. (2018), find that about 73.9% of total respondents who consumed peanut-based products have inadequate knowledge, while only 26.1% have adequate knowledge of contaminated peanut-based products. This study shows that the percentage of inadequate knowledge of respondents is higher due to the level of awareness on contaminated peanut-based products is low.

2.2.2 Attitude

Attitude is defined as a person's significant behavior which represents the perception's likely consequences of the behaviour (Conner, 2001). Personal significance about attitude is determined by individual interest, social identification, and values (Howe and Krosnick, 2017). It can conclude that the combination of attitude and personal significance improves an individual's behavioral intention.

According to a previous study by Shah, Shi, Ashley, Kronfel, Wang, Maleki, and Zhang (2019), the level of attitude towards food contamination was high. This study stated that there was a high amount of effort consumers' awareness towards food contamination. A study by Prestes, Pereira, Silva, Pena, and Nascimento (2019), carried out that, the mean score of attitude had a moderate level towards the contaminated peanut-based product. Meanwhile, a study by Haji, Ehrampoush, Amiri, Khalatbari, Gerayllo, and Hosseini (2015), carried out that high mean score (M=3.81) of attitude towards food contamination. This study shows that respondents that have a high-level attitude towards food contamination influence a high level of awareness towards food contamination.

2.2.3 Subjective Norm

Subjective norms are defined as normative influences or perceived social pressure to perform or not perform a behaviour (Park, 2000). According to Manning (2009), subjective norms are the perceived pressures imposed by others such as parents, neighbors, friends, peers, etc., who perform the behavior of interest and have either a direct or indirect influence on the respondent's behavior.

From a previous study, Ashraf, Joarder, and Ratan (2019) concluded that the level of the subjective norm was high when consumers believe their parents or friends think that consuming the food not exposed to contamination is important for health, they will likely be aware of the contaminated peanut-based products. A study by Barrette and Feng (2021), stated that the level of the subjective norm was high due to high awareness from surrounding including family and colleagues. However, it contradicts with Sanusi (2020), that concluded the mean score (M=1.89) of subjective norm was low towards food contamination. This study stated that, low level of the subjective norm when parents, neighbors, friends, peers have low awareness towards food contamination.

2.2.4 Perceived Behavior Control

Perceived behavioral control is refer to the individual being more likely to engage in a behavior if they believe it is simple, convenient, and does not require a lot of time to practice (Shapiro, Porticella, Jiang, and Gravani, 2011). According to Chiou (1998) perceived behavioral control reflects a person's actions in his or her ability to form behavioral intention.

A study by Harris, Ali and Ryu (2018), stated that there was a high level of perceived behavioral control towards contaminated food products among consumers. In a previous study, Hassan et al. (2018) carried out that the result of perceived behavioral control had a high mean score (M=3.812) for consumers who consumed hygienic food. This study concluded that a high level of consumers' awareness towards contaminated products will influence the level of perceived behavioral control which is the consumers to consume hygienic food. Different with research by Psouni et al. (2016), the level of perceived behavioral control towards food contamination was low due to a lack of awareness of food contamination among consumers.

2.3 The Effect of Knowledge, Attitude, Subjective Norm, Perceived Behavior Control on Consumers' Awareness towards Contaminated Peanut-Based Products.

This section explained the effect of knowledge, attitude, subjective norm, and perceived behavioral control on consumers' awareness towards contaminated peanut-based products.

2.3.1 The Effect of Knowledge on Consumers' Awareness towards Contaminated Peanut-Based Products.

Adequate knowledge of contaminated peanut-based products is important for raising consumers' awareness of contaminated peanut-based products (Azaman et al. 2016). The effect of adequate knowledge on contaminated peanut-based products can prevent food-borne illness (Holakouie Naieni, Ghods, Ghorbani, Bagheri, and Abdolshahi, 2020). This is because when consumers gain knowledge on how the nature of aflatoxin is produced in peanuts and known adverse health from aflatoxin when entering the human body can increase the awareness of consumers toward contaminated peanut-based products.

A study from Hassan et al. (2018) concluded that there was a significant correlation coefficient at 0.823 level between knowledge and awareness and has a high positive correlation. Supported by Toma (2019) there was a significant correlation between knowledge and level of awareness in eating healthy food. This study found that level of

knowledge of the respondents towards healthy food influences respondents' awareness towards contaminated products. This is consistent with the findings of the study from Toh and Birchenough (2017), there was a significant relationship between knowledge of consumers towards contaminated food with consumers' awareness towards food products.

2.3.2 The Effect of Attitude on Consumers' Awareness towards Contaminated Peanut-Based Products.

Attitude towards consumers is influenced by awareness towards contaminated peanut-based products (Ishak and Zabil, 2012). From their research, they concluded that attitude is referring to the level of awareness of consumers towards contaminated peanut-based products such as knowing the symptom, causes, and effects of contaminated peanut-based products. However, the attitude of consumers that are aware of the effects of the contaminated peanut-based product can prevent adverse health (Shephard, 2018).

A study from Holakouie et al. (2020) carried out that the significant correlation from their study was r = 0.82 which has a high positive attitude toward peanut contamination. This study shows that a higher level of awareness had a more positive attitude in preventing peanut contamination. In Azaman et al. (2016), a study also carried out that there was a positive correlation of attitude towards Aflatoxins contamination due to a high level of awareness towards contaminated peanut-based products. A study by Shephard (2018), found that the

significant correlation from their study was r = 0.87 which is has a high positive attitude of consumers towards food hygiene.

2.3.3 The Effect of Subjective Norm on Consumers' Awareness of Contaminated Peanut-Based Products.

Subjective norms have a direct effect on consumers' awareness (La Barbera and Ajzen, 2020). According to Odeyemi et al. (2019), consumers' families, relatives, friends, and colleagues determine the subjective norms. In the case of food contamination, when an individual believes that important people like family or relatives accept that food contamination prevention behaviors are important, they are more likely to engage in these behaviors.

A study from Sanusi, (2020) stated that family members, friends, colleagues have the lowest influence in awareness toward food contaminated products. The result from this study found that subjective norms had a low positive correlation on the consumers' awareness toward contaminated peanut-based products. This study shows that the roles of family, friends, and colleagues are very instrumental in influencing the respondents' awareness of healthy eating behaviour. A study by Chan et al. (2016) discovered that there was a positive correlation between subjective norm and awareness of healthy eating habits among consumers.

Meanwhile, a study from Barrette and Feng (2021) concluded that individual personality traits and self-concept which relate to subjective norms have a significant influence on an individual's awareness of food contamination. This study shows that colleagues, teachers, neighbours, and parents are a key influence on an individual's awareness of food contamination.

2.3.4 The Effect of Perceived Behavioral Control on Consumers' Awareness of Contaminated Peanut-Based Products.

The perceived behavioral control of the focal person in a decision-making situation may influence his or her behavioral intentions (Ajzen, 2002). It concluded that, when consumers consumed peanut-based products, consumers may need not only more resources (cost, information, etc.) but also more self-confidence in making a proper decision.

A study from Harrison (2012), stated that there was a high positive correlation between the ability to control hygienic consumer behavior in purchasing contaminated peanut-based products with awareness towards a contaminated peanut-based product. Similar with Psouni et al. (2016), there was a significant at 0.812 level between perceived behavioural control in consuming contaminated food products with awareness towards consuming food products. A previous study also agreed there was a high positive relationship between perceived behavioral control with awareness toward healthy eating (Backman et al. 2002; Gronhoj et al. 2013; Chan et al. 2016).

2.4 Summary

This chapter describes the consumers' awareness towards contaminated peanut-based products, as well as the theory used in this study. This chapter also briefly discusses consumers' awareness towards contaminated peanut-based products based on independent variables including knowledge, attitude, subjective norm, and perceived behavioral control which using Theory of Planned Behavior (TPB) and Knowledge, Attitude, and Practice (KAP) model. Aside from that, the effect of knowledge, attitude, subjective norm, and perceived behavioral control on consumers' awareness towards contaminated peanut-based products is clearly explained, it shows the significance of two relationships between independent and dependent variables.

CHAPTER 3

METHODOLOGY

3.0 Introduction

This chapter, it was explaining what procedure can be used in this study. This chapter was discussing the way how the research was conducted and what method can be used. The first part of the discussion is about research design, and the second part is about the research framework. The procedure for instrumentation, population, sampling, and data preparation was being included in the third section of the research.

3.1 Research Design

A quantitative research design was being used to collect information from respondents for this study. Statistical Package for Social Science Software (SPSS) was being used to enter data and analyse socio-demographic profiles, independent and dependent variables.

3.2 Research Framework

A research framework was being developed to identify consumers' awareness towards contaminated peanut-based products in Terengganu. The dependent variable is consumers' awareness towards contaminated peanut-based products while the independent variables are knowledge, attitude, subjective norm, and perceived behavioural control that was adapted from Theory of Planned Behavior (TPB) and Knowledge, Attitude, the (KAP).

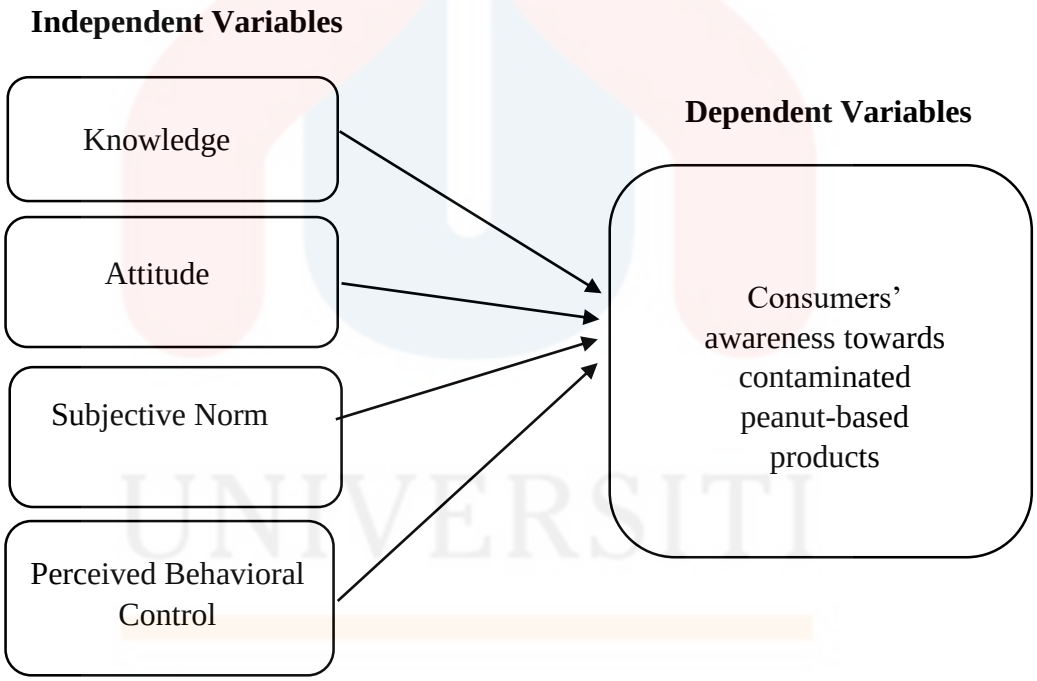

Figure 3.1: The conceptual framework (Adapted by Ajzen, 1991 and Schwartz, 1976)

3.3 Instrumentation

Questionnaires was being distributed to respondents among consumers in Terengganu and the entire questionnaire was analysed. The questionnaire was created in both Malay and English and consisted of pertinent questions based on the objectives of the study. The survey questions included sections A, B, C, D, E, and F. In section A, questions based on the socio-demographic of consumers in Terengganu. In section B, questions are based on consumers' awareness of contaminated peanut-based products (dependent variables). In sections C, D, E, and F, questions are based on independent variables such as knowledge, attitude, subjective norm, and perceived behavioral control respectively.

3.3.1 Section A: Socio-demographic profile

In section A, questions will be asked for this section is socio-demographic profiles of the consumers in Terengganu. The questions for this section were included age, gender, race, religion, marital status, educational level, number of households, and income.

3.3.2 Section B: Dependent Variable

In section B, was consisted of questions on consumers' awareness towards contaminated peanut-based products in Terengganu. The questions in this section was being designed to measure consumers' awareness of contaminated peanut-based products.

3.3.3 Section C, D, E, and F: Independent Variables

In this section, the respondents answered the questions based on independent variables. Section C, D, E, and F were knowledge, attitude, subjective norm, and perceived behavioural control respectively. This study was being using a 3-point Likert scale to measure the level of knowledge, these questions were created based on statements about the issues of contaminated peanut-based products such as No=1, Not Sure=2, and Yes=3. For sections D, E, and F the questionnaire was recorded using a point scale which presents strongly disagree, disagree, slightly agree, agree, and strongly agree on a scale of 1 to 5 respectively.

3.4 Population and sample

Terengganu was selected as population and sample for this study because there are issues of contaminated peanut-based products in Terengganu due to Aflatoxin level exceeding the permitted limit by Malaysia Food Act 1983 and Regulation 1985 (Hong et al. 2010). The total respondents is 150 consumers.

3.4.1 Sample Size

This study targeted the consumers in Terengganu about awareness toward contaminated peanut-based products. The sample size was 150 respondents, and they all filled out the prepared questionnaires. According to Hill (1976), the sample size was focused on the typical sample size for social science studies of human behaviour. Furthermore, by using a formula with the exact amount of sample size, Slovin's formula revealed the relevant sample size outcome (Delice, 2010). Based on Slovin's formula, 150 respondents are the sufficient sample size for social science studies. However, the minimum sample size of the study is N=50 which is generally accepted as a technique from Exploratory Factor Analysis (EFA) but larger sample sizes can reduce sampling error, and it suggested the sample size is more than 100 (de Winter, Dodou, and Wieringa, 2009)

3.4.2 Sampling procedure

Purposive sampling was being used in this study to identify target respondents who met certain requirements or standards. Purposive sampling is a sampling technique in which the researcher specifies the socio-demographic profile of the respondents.

3.5 Data Preparation

The completed questionnaire was being tested in a pilot study to ensure its accuracy. Following that, the pilot test results were analysed using a reliability test.

3.5.1 Pilot Study

A pilot study was being conducted to check there is no difference in understanding between both Malay and English versions of the questionnaire and to ensure that all questions were clear and properly structured. A pre-test was being carried out by distributing it to consumers in Terengganu and the questionnaire was created with the important information required to achieve the objective of the study. The sample size of 30 respondents among consumers in Terengganu was used, and it is sufficient to assess the viability of the survey by determining whether the questionnaires prepared are acceptable and easy to understand.

3.5.3 Reliability Test

To determine the proportion of systematic variation in scale, a reliability test was used. In this study, the reliability analysis used Cronbach's alpha to measure the reliability of the questionnaire by using SPSS statistics which are commonly used to measure internal consistency. Normally, Cronbach's alpha reliability coefficients typically ranged from 0 to 1. The greater the internal consistency of the variables on the scale, the closer the coefficient to 1.0. However, if the Cronbach's alpha reading is greater than 0.6, then all of the variables are suitable for this study (Taber, 2018)

Table 3.1 below shows the results of the reliability test includes knowledge, attitude, subjective norm, perceived behavioral control, and consumer's awareness towards contaminated peanut-based products. The value of Cronbach's Alpha for all the variables were above 0.7 and the variables are acceptable for this study. As a result, it is possible to conclude that the KAP model and TPB are suitable to use for this study because the value of Cronbach's Alpha is consistent for all variables.

Table 3.1 Reliability test

Variable	Cronbach's Alpha	Number of items
Knowledge	0.846	8
Attitude	0.779	7
Subjective Norm	0.928	7
Perceived Behavioral Control	0.957	7
Consumer's Awareness Towards Contaminated Peanut Based Products	0.833	6

3.6 Data Analysis

Data analysis is the method of interpreting or evaluating data using analytical and statistical tools to analyse and prove the data's accuracy. By using the SPSS program, descriptive statistics include mean, minimum, maximum, frequency, percentages, and standard deviation was calculated. In this study, the data were analysed using methods such as the reliability test, descriptive analysis, normality test, and Spearman correlation analysis.

3.7 Summary

From this chapter, the research design is a guideline for research conduct. This study was being used the SPSS program to analyse or interpret the data. Aside from that, 150 respondents from consumers in Terengganu were chosen as the sample size. The methods were being used in this study include reliability tests, descriptive analysis, normality test, and Spearman correlation analysis.

CHAPTER 4

RESULT AND DISCUSSION

4.0 Introduction

This chapter discusses the survey's results and discussion. This study was applying a purposive sampling method that was involved 150 consumers in Terengganu. The data of the respondents was collected by answering the questionnaires from google form. There are few respondents was answering the questionnaires on paper. The respondents are Terengganu residents who consume peanut-based products. This data analysis focuses on the study's objectives, which are based on the level of awareness, knowledge, attitude, subjective norms, and perceived behaviour control of consumers' awareness towards contaminated peanut-based products in Terengganu.

4.1 Descriptive analysis

Descriptive analysis is based on data that has been collected and summarises the data points. This analysis focuses on the percentage and frequency of each level of awareness, knowledge, attitude, subjective norm, and perceived behavioural control of consumers' awareness towards contaminated peanut-based products in Terengganu. This analysis has also been used on the Likert Scale questionnaire to determine the percentage and mean of each question for awareness, knowledge, attitude, subjective norm, and perceived behaviour control.

4.1.1 Demographic Profile

Descriptive analyses are used to determine the demographic profile of consumers' awareness towards contaminated peanut-based products in Terengganu. Demographic data consists of gender, age, education level, race, income, and how often consumers eat peanuts.

The result shows that most of the respondents were female 70% and the remaining percentage was male 30%. The highest percentage of consumers' aged were 96% which is 20-29 years old, followed by aged 30-39 years old the percentage were 2.7%. The lowest percentage for consumers' age were 0.7% and both have the same percentage for the aged 40-49 years old and 50-59 years old.

According to the survey results, the respondents' education level was classified into six categories, the majority of which were degree holders 85.3%. The remaining percentages

Diploma were 7.3%, STPM/STAM/Matriculation were 3.3%, Technical Certificate were 2.0% and SRP/SPM were 2.0%. The majority of respondents were Malay 70.7% and the remaining were Chinese 24.7%, Indian were 2.7% and others were 2.0%.

The respondents' income was classified into four groups which are below RM500, RM501-RM5000, RM5001-RM10000, and above RM10001. Most of the respondents' income was below RM500 (62.7%), followed by RM501-RM5000 (32.7%), RM5001-RM10000 (4.0%) and the lowest percentage of respondents' income were above RM10001 (0.7%). The results for the percentage of how often consumers eat peanuts were classified into four categorised which are less than once a month, 1-2 times a month, once a week, and 1-2 times a week. The highest percentage for how often consumers eat peanuts was less than once a month (50.7%). The remaining percentage was 1-2 times a month (41.3%), and the lowest percentage was once a week (4.7%).

Table 4.1: Demographic profile of the consumers of peanut based-products

	Character	Frequency	Percent
Gender	Male	45	30.0
	Female	105	70.0
Age	20-29	144	96.0
	30-39	4	2.7
	40-49	1	0.7
	50-59	1	0.7
Education level	SRP/SPM	3	2.0
	Technical Certificate	3	2.0
	STPM/STAM/Matriculation	5	3.3
	Diploma	11	7.3
	Degree/Master/PhD	128	85.3
Race	Malay	106	70.7
	Chinese	37	24.7
	Indian	4	2.7
	Others	3	2.0
Income	<RM500	94	62.7
	RM501-RM5000	49	32.7
	RM5001-RM10000	6	4.0
	>RM10001	1	0.7
How often consumers eat peanuts	Less than once a month	76	50.7
	1-2 times a month	62	41.3
	Once a week	7	4.7
	1-2 times a week	5	3.3

4.1.2 Level of consumers' awareness towards contaminated peanut-based products in Terengganu

Table 4.2 shows the descriptive analysis results for consumers' awareness of contaminated peanut-based products. The statement "I am aware that knowing about contaminated peanut-based products can keep me from getting food poisoning" was 38% strongly agreed by consumers and 30% of consumers agreed with the statement. Followed by 18% of consumers either agree or disagree with the statement, 8% of consumers disagree with the statement, and 6% of consumers strongly disagree with the statement. From that, the result shows that most of the consumers were aware that knowing about contaminated peanut-based products can keep them from getting food poisoning.

The result shows that 32% of consumers either agree or disagree with the statement "I am aware that peanuts-based products are susceptible to aflatoxins", while 24% of consumers agreed with the statement, 20.7% of consumers were strongly agree with the statement. For consumers who disagree with the statement, the result shows that 13.3% and 10% strongly disagreed with the statement. It shows that 44.7% were aware that peanut-based products are susceptible to aflatoxins.

For the statement "I am aware of eating peanut have high risk towards food contamination" 28.7% of consumers agreed with this statement. Followed by 28% of consumers were either agree or disagree, 18% of consumers disagreed with the statement, 14% of consumers strongly agreed with the statement and 11.3% of consumers were strongly disagreed. It shows that 40% of consumers were aware of eating peanut have a high risk of food contamination.

From Table 4.2, the statement “I am aware contaminated peanut-based products can lead to food poisoning” shows 33.3% of consumers agreed with this statement. Besides about 30.7% of consumers were strongly agreed, 20.7% of consumers were either agree or disagree ,8% of consumers disagreed and 7.3% of consumers were strongly disagreed with the statement. It shows that most consumers were aware that contaminated peanut-based products can lead to food poisoning.

For the statement “I realize that food contamination can occur in a peanut-based product”, the study found that 28.7% of consumers agreed with this statement, followed by 26% of consumers were strongly agree with the statement. About 24.7% of consumers were either agree or disagree, 10% of consumers disagreed and 10.7% of consumers were strongly disagreed with the statement. This statement shows that the majority of consumers realize that food contamination can occur in peanut-based product.

About 39.3% of consumers were strongly agreed with the statement “I realize that it is important to read the labels that have HACCP logo on peanut-based products to make sure they are safe to eat”. Followed by 28.7% of consumers agreed, 21.3% of consumers were either agree or disagree with the statement. For disagree and strongly disagree statements, the percentage was the same which is 5.3%. From that, most of the respondents were realized that it is important to read the labels that have the HACCP logo on peanut-based products to make sure they are safe to eat.

Based on Table 4.3, the mean score shows that consumers’ awareness towards contaminated peanut-based products has a medium mean score (M=3.5778, SD=0.94096).

Contradict with a study by Bolek (2020), they concluded that consumers' awareness of food contamination has a low mean score (M=2.33) due to lack of knowledge and they are not aware of food contamination and issue related to food contamination. As an author, Soon (2018) support the statement, consumers have low awareness related to contaminated peanut-based products and are not aware of food contamination symptoms and their effects. Another supported statement by Hassan et al. (2018), found that the level of awareness among consumers has a low mean score towards food contamination.

Table 4.2: Descriptive analysis for consumers' awareness towards contaminated peanut-based products

Statements	**Percentage (%)**					**SD**	**Mean**
	1	2	3	4	5		
I am aware that knowing about contaminated peanut-based products can keep me from getting food poisoning.	6.0	8.0	18.0	30.0	38.0	1.187	3.86
I am aware that peanuts-based products are susceptible to aflatoxins.	10.0	13.3	32.0	24.0	20.7	1.228	3.32
I am aware of eating peanut have high risk towards food contamination.	11.3	18.0	28.0	28.7	14.0	1.210	3.16
I am aware contaminated peanut-based products can lead to food poisoning.	7.3	8.0	20.7	33.3	30.7	1.193	3.72
I realize that food contamination can occur in peanut-based product.	10.7	10.0	24.7	28.7	26.0	1.273	3.49
I realize that it is important to read the labels that have HACCP logo on peanut-based products to make sure they are safe to eat.	5.3	5.3	21.3	28.7	39.3	1.141	3.91

*Indicator: 1. Strongly Disagree 2. Disagree 3. Either Agree or Disagree 4. Agree 5. Strongly Agree

Table 4.3 : Mean score of awareness

Variable	Frequency	Percentage (%)	Mean	SD
Awareness			3.5778	0.94096
Low (1.00-2.33)	14	9.3		
Medium (2.34-3.67)	67	44.7		
High (3.68-5.00)	69	46.0		

4.1.3 Level of attitude of consumers towards contaminated peanut-based products in Terengganu

Table 4.4 shows a descriptive analysis of the attitude of consumers towards contaminated peanut-based products. The statement "I will make sure that the peanut-based products I buy are not contaminated and safe to eat" was strongly agreed 50% by consumers. About 29.3% of consumers agreed with the statement, 14.7% of consumers were either agree or disagree with the statement, and 6% have disagreed with the statement. It shows that most of the respondents were make sure that the peanut-based products they buy are not contaminated and safe to eat.

The statement "I think peanut-based products that I have been using should be stored properly to protect from mould" was 53.3% strongly agreed by consumers. About 35.3% agree with the statement, 9.3% either agree or disagree with the statement, and 2.0% disagreed with the statement. It shows that most of the respondents were agree with the statement of peanut-based products that have been used should be stored properly to protect them from mould.

"I know that peanut-based products are easy to contaminate" is a statement with the response 34.7% of consumers either agree or disagree. To agree with the statement, there was 24% of consumers responded, and 22% of consumers were strongly agreed. For disagree with the statement, there was 12% of consumers response and 7.3% of consumers were strongly disagree. It shows that the majority of consumers know that peanut-based products are easy to contaminate.

For the statement "I believe well processed peanut-based products are safe to eat", there was 41.3% of consumers were strongly agree. About 40.7% of consumers agreed, 17.3% of consumers either agree or disagree and 0.7% of consumers disagree. Surprisingly, there was 82% of consumers believe well processed peanut-based products are safe to eat.

The result shows that 42% of consumers agreed with the statement "I am sure most peanut-based products on the market are safe to eat". About 41.3% of consumers strongly agreed, 17.3% of consumers were either agree or disagree and 0.7% of consumers disagreed with the statement. It shows that most of the consumers are sure that most peanut-based products on the market are safe to eat.

For the statement "I would buy peanut-based products that have good packaging", there was 48) ~~of~~ consumers were strongly agree. About 34% of consumers agreed, 17.3% of consumers were either agree or disagree and 0.7% of consumers disagreed. The majority of the consumers would buy peanut-based products that have good packaging.

Based on Table 4.5, the mean score of attitude was high (M=4.1029, SD=0.57504). Similar to a previous study by Shah et al. (2019), they also found that the level of attitude towards food contamination was high. This study stated that there was a high amount of effort consumers' awareness towards food contamination. As the author, Haji et al. (2015) support the statement, which they found that the mean score was high (M=3.81) of respondents have a high level of attitude towards food contamination. This study shows that respondents that have a high-level attitude towards food contamination influence a high level of awareness towards food contamination. Contradict with Prestes et al. (2019), carried out that the mean score of attitude had a moderate level towards the contaminated peanut-based product.

Table 4.4: Descriptive analysis for the attitude of consumers towards contaminated peanut-based products

Statements	**Percentage (%)**					**SD**	**Mean**
	1	2	3	4	5		
I will make sure that the peanut-based products I buy are not contaminated and safe to eat.		6.0	14.7	29.3	50.0	0.915	4.23
I think peanut-based products that I have been using should be store in a proper manner to protect from mould.		2.0	9.3	35.3	53.3	0.742	4.40
I know that peanut-based products are easily to contaminated.	7.3	12.0	34.7	24.0	22.0	1.171	3.41
I believe well processed peanut-based products are safe to eat.		0.7	17.3	40.7	41.3	0.752	4.23
I am sure most peanut-based products on the market are safe to eat.	0.7	1.3	24.7	42.0	31.3	0.823	4.02
I believe that eating contaminated peanut can result in food poisoning.	2.0	2.7	18.7	33.3	43.3	0.946	4.13
I would buy peanut-based products that have good packaging.		0.7	17.3	34.0	48.0	0.773	4.29

*Indicator: 1. Strongly Disagree 2. Disagree 3. Either Agree or Disagree 4. Agree 5. Strongly Agree

Table 4.5 : Mean score of attitude

Variable	Frequency	Percentage (%)	Mean	SD
Attitude			4.1029	0.57504
Low (1.00-2.33)				
Medium (2.34-3.67)	34	22.7		
High (3.68-5.00)	116	77.3		

4.1.4 Level of subjective norm of consumers' awareness towards contaminated peanut-based products in Terengganu

The result from Table 4.6 shows a descriptive analysis for a subjective norm of consumers towards contaminated peanut-based products. For the statement "My family members always remind me to buy peanut-based products that are safe to eat", there was 27.3% of consumers were strongly agree, 26.7% of consumers agreed. For either or disagree of consumers with the statement were 24%, while 13.3% of consumers disagreed and 8.7% of consumers were strongly disagreed.

For the statement "My surrounding community who influenced me to buy peanut-based products that are safe to eat", 36% of consumers agreed, and 22.7% of consumers strongly agreed. About 20% of consumers were either agree or disagree, 12.7% of consumers have disagreed and 8.7% of consumers were strongly disagreed. It shows that the surrounding community influenced the respondents to buy peanut-based products that are safe to eat.

"Media information such as (Facebook, Twitter, WhatsApp, etc.) encourage me to know about the contaminated peanuts-based product" is a statement with the response 32.7% were either agree or disagree. About 27.3% of consumers agreed, 23.3% of consumers were strongly agreed, 9.3% of consumers disagreed, and 7.3% of consumers were strongly disagreed. This statement shows that media information such as (Facebook, Twitter, WhatsApp, etc.) does not encourage the consumers to know about the contaminated peanuts-based product.

The result shows that 34.7% of consumers strongly agreed and 32.7% of consumers agreed with the statement "News and issues about food poisoning from peanut-based products alerted me to be careful when buying peanut-based products". About 22% of consumers were either agree or disagree with the statement, 8% of consumers have disagreed and 7.3% of consumers were strongly disagreed. It shows that 67.4% of consumers agreed with the news and issues about food poisoning from peanut-based products alerted them to be careful when buying peanut-based products.

For the statement "The Food Safety campaign influenced me to always be vigilant to buy peanut-based products", 37.3% of consumers agreed, and 29.3% of consumers were strongly agreed. For either agrees or disagree with the statement, there were 22.7%. About 6.7% of consumers were disagree and 4% of consumers were strongly disagreed. It shows that the Food Safety campaign influenced the consumers to always be vigilant to buy peanut-based products.

The result shows that 41.3% of consumers strongly agreed and 40% of consumers agreed with the statement "The information in the peanut-based product label convinced me that the product is safe to eat". About 15.3% of consumers were either agree or disagree with

the statement, 2% of consumers were disagreed and 1.3% of consumers were strongly disagreed. It shows that the information in the peanut-based product label convinced the consumers that the product is safe to eat.

For the statement "The peanut-based product brands on the market convinced me that they were safe to eat", 42% of consumers agreed and 34.7% of consumers strongly agree. About 18% of consumers were either agree or disagree, 4% of consumers have disagreed and 1.3% of consumers were strongly disagreed. This statement shows that the peanut-based product brands on the market convinced the consumers that they were safe to eat.

Based on Table 4.7, the mean score of a subjective norm was high (M=3.7781, SD=0.83111). This is proven by Ashraf, Joarder, and Ratan (2019), who concluded that the level of a subjective norm was high when consumers believe their parents or friends think that consuming the food not exposed to contamination is important for health, they will likely be aware of the contaminated peanut-based products. As the author Barrette and Feng (2021), support the statement which is they stated that the level of the subjective norm is high due to high awareness from surrounding including family and colleagues. Contradict with the previous study by Sanusi (2020), concluded that the mean score (M=1.89) of a subjective norm was low towards food contamination. This study stated that, low level of the subjective norm when parents, neighbors, friends, peers have low awareness towards food contamination.

Table 4.6 : Descriptive analysis for subjective norm of consumers towards contaminated peanut-based products

Statements	**Percentage (%)**					**SD**	**Mean**
	1	2	3	4	5		
My family members always remind me to buy peanut-based products that are safe to eat.	8.7	13.3	24.0	26.7	27.3	1.263	3.51
My surrounding community who influenced me to buy peanut-based products that are safe to eat.	8.7	12.7	20.0	36.0	22.7	1.219	3.51
Media information such as (Facebook, Twitter, WhatsApp, etc.) encourage me to known about contaminated peanuts-based product.	7.3	9.3	32.7	27.3	23.3	1.163	3.50
News and issues about food poisoning from peanut-based products alerted me to be careful when buying peanut-based products.	2.7	8.0	22.0	32.7	34.7	1.059	3.89
The Food Safety campaign influenced me to always be vigilant to buy peanut-based products.	4.0	6.7	22.7	37.3	29.3	1.058	3.81
The information in the peanut-based product label convinced me that the product is safe to eat.	1.3	2.0	15.3	40.0	41.3	0.860	4.18
The peanut-based product brands on the market convinced me that they were safe to eat.	1.3	4.0	18.0	42.0	34.7	0.900	4.05

*Indicator: 1. Strongly Disagree 2. Disagree 3. Either Agree or Disagree 4. Agree 5. Strongly Agree

Table 4.7: Mean score of subjective norm

Variable	Frequency	Percentage (%)	Mean	SD
Subjective norm			3.7781	0.83111
Low (1.00-2.33)	10	6.7		
Medium (2.34-3.67)	50	33.3		
High (3.68-5.00)	90	60.0		

4.1.5 Level of perceived behavioral control of consumers towards contaminated peanut-based products in Terengganu

Table 4.8 shows the descriptive analysis for perceived behavioral control of consumers towards contaminated peanut-based products. For the statement "I am knowledgeable about food contamination especially on contamination of aflatoxin in the peanut-based product", 30.7% of consumers were either agree or disagree with the statement. About 26.7% of consumers were agree and 16.7% of consumers were strongly agreed. For strongly disagree, there were 14% of consumers and 12% of consumers have disagreed. It shows that most of the consumers are not knowledgeable about food contamination especially on contamination of aflatoxin in a peanut-based product.

For the statement "It easy for me to get information about the contaminated peanut-based product", 30.07% of consumers were agree and 20.07% of consumers were strongly agreed. About 28% of consumers were either agree or disagree, 13.3% of consumers have disagreed and 7.3% of consumers were strongly disagreed. The statement shows that the consumers easy to get information about the contaminated peanut-based product.

"I have enough information about the contaminated peanut-based product" is a statement with the response 29.3% of consumers were agree and 14% of consumers strongly agreed. About 26.7% of consumers were either agree or disagree, 18% of consumers have disagreed and 12% of consumers were strongly disagreed. It shows that the consumers don't have enough information about the contaminated peanut-based product.

The result shows that 27.3% of consumers were either agree or disagree with the statement "I am familiar with the issues of peanut contamination". About 22.7% of consumers agreed and 14% of consumers strongly agreed. For disagree with the statement, there were 18.7% of consumers response and 17.3% of consumers were strongly disagree. Most of the respondents were not familiar with the issues of peanut contamination.

For the statement "It is easy for me to identify contaminated peanut-based products", 32.7% of consumers agreed, and 13.3% of consumers strongly agreed. About 22% of consumers were either agree or disagree, 16.7% of consumers have disagreed and 15.3% of consumers were strongly disagreed. It shows that it is not easy for consumers to identify contaminated peanut-based products.

"I can avoid buying contaminated peanut-based products" is a statement with the response 37.3% of consumers were agree and 16.7% of consumers strongly agreed. About 26% of consumers were either agree or disagree, 13.3% of consumers have disagreed, and 6.7% of consumers strongly disagree. It shows that the consumers were able to avoid buying contaminated peanut-based products.

For the statement "It is easy for me to understand the labels of peanut-based products that are safe from aflatoxin contamination", 35.3% of consumers agreed and 23.3% of

consumers strongly agreed. For either agree or disagree statement from consumers were 21.3%. About 10.7% of consumers were disagree and 9.3% of consumers were strongly disagreed. The result of the statement shows that it is easy for the consumers to understand the labels of peanut-based products that are safe from aflatoxin contamination.

Based on Table 4.9, shows the result of the mean score of perceived behavioral control was medium (M=3.2648, SD=1.05231). Contradict with Hassan et al. (2018), they carried out that the result of perceived behavioral control has a high mean score (M=3.812) for consumers who consumed hygienic food. This study concluded that a high level of consumers' awareness towards contaminated products will influence the level of perceived behavioral control which is the consumers to consume hygienic food. The authors by Harris, Ali and Ryu (2018), support the statement which is they stated that there was a high level of perceived behavioral control towards contaminated food products among consumers. However, contradicting research by Psouni et al. (2016), the level of perceived behavioral control towards food contamination was low due to a lack of awareness of food contamination among consumers.

Table 4.8 : Descriptive analysis for perceived behavioral control of consumers towards contaminated peanut-based products

Statements	**Percentage (%)**					**SD**	**Mean**
	1	2	3	4	5		
I am knowledgeable about food contamination especially on contamination of aflatoxin in the peanut-based product.	14.0	12.0	30.7	26.7	16.7	0.915	4.23
It is easy for me to get information about contaminated peanut-based products.	7.3	13.3	28.0	30.7	20.7	0.742	4.40
I have enough information about the contaminated peanut-based product.	12.0	18.0	26.7	29.3	14.0	1.171	3.41
I am familiar with the issues of peanut contamination.	17.3	18.7	27.3	22.7	14.0	0.752	4.23
It is easy for me to identify contaminated peanut-based products.	15.3	16.7	22.0	32.7	13.3	0.823	4.02
I am able to avoid buying contaminated peanut-based products.	6.7	13.3	26.0	37.3	16.7	0.946	4.13
It is easy for me to understand the labels of peanut-based products that are safe from aflatoxin contamination.	9.3	10.7	21.3	35.3	23.3	0.773	4.29

*Indicator: 1. Strongly Disagree 2. Disagree 3. Either Agree or Disagree 4. Agree 5. Strongly Agree

Table 4.9 : Mean score of perceived behavioral control

Variable	Frequency	Percentage (%)	Mean	SD
Perceived behavioral control			3.2648	1.05231
Low (1.00-2.33)	30	20.0		
Medium (2.34-3.67)	55	36.7		
High (3.68-5.00)	65	43.3		

4.1.6 Level of knowledge of consumers' awareness towards contaminated peanut-based products in Terengganu

Table 4.10 shows the descriptive analysis for knowledge of consumers towards contaminated peanut-based products. For the statement "Poor storage conditions will promote the presence of aflatoxins in peanuts based product", 57.3% of consumers were response yes. About 41.3% of consumers were not sure and 1.3% of consumers were response no. It shows that half of the consumers were known and half of the consumers do not know poor storage conditions will promote the presence of aflatoxins in peanuts-based products.

For the statement "Aflatoxin exposure from peanuts can be controlled and reduced by visually checking nuts for moldy-looking, discolored, or shriveled", 52% of consumers were response yes. About 46% of consumers not sure and 2% of consumers were response no. It can be concluded that 52% were sure with the statement and the remaining were not sure and do not know.

"Intake of peanuts that contains aflatoxins have adverse health implications" is a statement with the response 59.3% of consumers were response yes. About 37.3% of consumers were not sure and 3.3% of consumers were response no. It shows that, most consumers known intake of peanuts that contains aflatoxins have adverse health implications.

The result shows that 52% were response yes with the statement "Processed peanuts products exposes peanuts to oxygen and can promote the presence of mould". About 53.3% of consumers were not sure and 4.7% of consumers were response no. The result of the

statement shows that the consumers were not sure and do not know that processed peanuts products exposes peanuts to oxygen and can promote the presence of mould.

For the statement “The frequency of aflatoxins contamination is higher in processed peanut products than in raw peanuts in their shells”, 56% of consumers were not sure with the statement. About 40% of consumers were response, yes and 4% of consumers were response no. It shows that most of the consumers were not sure that the frequency of aflatoxins contamination is higher in processed peanut products than in raw peanuts in their shells.

“Peanuts products like “roasted peanut”, “peanut butter”, and “peanut cookies” easily contain aflatoxins” is a statement with a response 59.3% of consumers were not sure. About 34% of consumers were response, yes and 6.7% of consumers were response no. The result of the statement shows that the majority of consumers do not know peanuts products like “roasted peanut”, “peanut butter”, and “peanut cookies” are easily contain aflatoxins.

For the statement “Mould growth in peanut-based products easily contain aflatoxins”, 49.3% of consumers were not sure. About 46% of consumers were response, yes and 4.7% of consumers were response no. It shows that consumers were not sure mould growth in peanut-based products is easily contained aflatoxins.

Lastly, for the statement “Precaution must be taken to not intake peanuts that show any sign of damage or mould growth”, 71.3% of consumers were response yes. About 26% of consumers were not sure and 2.7% of consumers were response no. It can be concluded that the majority of consumers agree that precaution must be taken to not intake peanuts that show any sign of damage or mould growth.

Based on Table 4.11, the result shows the percentage of adequate knowledge was 79.3% and the mean score was high (M=2.4783) (SD=0.38826). Previous studies by Leong et al. (2018) have a dissimilar result of the level of knowledge from this study. In their research, they found that there was a low level of knowledge about aflatoxin which is only 5% have adequate knowledge about aflatoxins. Consistent with the study by Mohd Azaman et al. (2015), they stated that there is inadequate knowledge about aflatoxin contamination in peanut-based products for knowledge statement "aflatoxin contamination can occur in peanut-based products". Their study shows that respondents have inadequate knowledge about aflatoxin contamination in the peanut-based product due to level of awareness towards contamination of peanut-based products is low. A study from Hassan et al. (2018), supports the statement which is they found that about 73.9% of total respondents who consumed peanut-based products have inadequate knowledge, while only 26.1% have adequate knowledge of contaminated peanut-based products. This study shows that the percentage of inadequate knowledge of respondents was higher due to the level of awareness on contaminated peanut-based products was low.

Table 4.10: Descriptive analysis for knowledge of consumers towards contaminated peanut-based products

Statements	**Percentage (%)**			**SD**	**Mean**
	1	2	3		
Poor storage conditions will promote the presence of aflatoxins in peanuts-based products.	1.3	41.3	57.3	0.524	2.56
Aflatoxin exposure from peanuts can be controlled and reduced by visually checking nuts for moldy-looking, discolored, or shriveled.	2.0	46.0	52.0	0.540	2.50
Intake of peanuts that contains aflatoxins has adverse health implications.	3.3	37.3	59.3	0.561	2.56
Processed peanuts products expose peanuts to oxygen and can promote the presence of mould.	4.7	43.3	52.0	0.587	2.47
The frequency of aflatoxins contamination is higher in processed peanut products than in raw peanuts in their shells.	4.0	56.0	40.0	0.559	2.36
Peanuts products like “roasted peanut”, “peanut butter”, and “peanut cookies” easily contain aflatoxins.	6.7	59.3	34.0	0.578	2.27
Mould growth in peanut-based products easily contains aflatoxins.	4.7	49.3	46.0	0.581	2.41
Precaution must be taken to not intake peanuts that show any sign of damage or mold growth.	2.7	26.0	71.3	0.520	2.69

*Indicator: 1. No 2. Not sure 3. Yes

Table 4.11: Mean score of knowledge

Variable	Frequency	Percentage (%)	Mean	SD
Knowledge			2.4783	0.38826
Inadequate knowledge (1.00-2.00)	31	20.7		
Adequate knowledge (2.10-3.00)	119	79.3		

4.2 Normality Test

From this study, a normality test was used to determine whether the sample data was obtained from a normally distributed population or not following a normally distributed population. Based on the 4.12 shows that this study was used a Kolmogorov-Smirnova because the number of respondents exceeds 50 populations. The result of significance shows (P=0.001), which is consumers' awareness towards contaminated peanut based-products does not follow normally distributed because the variable of consumers' awareness towards contaminated peanut based-products is not significant as the value is <0.05.

Table 4.12: Normality test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistics	df	Sig	Statistic	df	Sig
Awareness of consumers towards contaminated peanut-based product	0.098	150	0.001	0.953	150	0.000

a. Lilliefors Significance Correction

4.3 Correlation Analyse

Correlation analysis was used in this section to examine the relationship between knowledge, attitude, subjective norm, and perceived behavioural control with consumers' awareness towards contaminated peanut based-products. The spearmen correlation was used to determine the relationship between the variables with consumers' awareness towards contaminated peanut based-products in Terengganu.

4.3.1 Spearman correlation

The Spearman correlation is typically used when the assumption of the bivariate normal distribution is not tenable (Artusi, Verderio & Marubini, 2002). According to Croux and Dehon (2010), Spearman's correlation assesses the direction and strength of a monotonic relationship between two variables. In this study, the spearman's correlation has been used to identify the relationship between knowledge, attitude, subjective norm, and perceived behavioral control with consumers' awareness towards contaminated peanut based-products in Terengganu.

Based on Table 4.13 below, the Rule of Thumb presented by Guildford (1973) was adopted for interpreting the size of a correlation coefficient. The values range for the size of correlation is from -1.0 to 1.0. A number greater than 1.0 or less than -1.0 indicates a correlation measure error. A correlation of -0.0 indicates a perfect negative correlation, while a correlation of 1.0 indicates a perfect positive correlation. According to Mukaka (2021), a

correlation of 0.0 does not indicate a relationship between the movements of the two variables.

Table 4.13: Rule of Thumb for Interpreting the Size of a Correlation Coefficient (Adapted by: Guildford, 1973)

Size of correlation	Interpretation
0.90 to 1.00 (-0.90 to -1.00)	Very high positive (negative) correlation
0.70 to 0.90 (-0.70 to -0.90)	High positive (negative) correlation
0.50 to 0.70 (-0.50 to -0.70)	Moderate positive (negative) correlation
0.30 to 0.50 (-0.30 to -0.50)	Low positive (negative) correlation
0.00 to 0.30 (0.00 to -0.30)	Negligible correlation

4.3.1.1 The Relationship between Attitude with consumers' awareness towards contaminated peanut based-products in Terengganu

Based on Table 4.14, the correlation coefficient between attitude with consumers' awareness towards contaminated peanut based-products in Terengganu was positive significant (r=0.397, p= 0.000). The rule of thumb in attitude for interpreting the size of correlation coefficient in Table 4.13 shows a low positive correlation between attitude with consumers' awareness towards contaminated peanut based-products in Terengganu.

A study from Holakouie et al. (2020) carried out that the correlation coefficient from their study was significant, r = 0.82 which had a high positive attitude toward peanut contamination. This study shows that a higher level of awareness had a more positive attitude in preventing peanut contamination. An author by Azaman et al. (2016), support the statement which is they found that there was a positive correlation of attitude towards Aflatoxins contamination due to a high level of awareness towards contaminated peanut-based products. Consistent with the study by Shephard (2018), found that the correlation coefficient from their study was significant, r = 0.87 which has a high positive attitude of consumers towards food hygiene. The result indicated that the result is accepted Hypothesis 1 predicted that attitude had a significant relationship with consumers' awareness towards contaminated peanut based-products in Terengganu.

4.3.1.2 The Relationship between Subjective norm with consumers' awareness towards contaminated peanut based-products in Terengganu

The correlation coefficient between subjective norm with consumers' awareness towards contaminated peanut based-products in Terengganu is positive significant ~~at~~ (r=0.420, p=0.000). Based on Table 4.13, the rule of thumb shows that attitude for interpreting the size of correlation coefficient was a low positive correlation (r=0.420) between attitude with consumers' awareness towards contaminated peanut based-products in Terengganu.

This is proven by a study by Sanusi, (2020) stated that family members, friends, colleagues have the lowest influence in awareness toward food contaminated products. The result from this study found that subjective norms had a low positive correlation on the consumers' awareness toward contaminated peanut-based products. This study shows that the roles of family, friends, and colleagues are very instrumental in influencing the respondents' awareness of healthy eating behaviour. Contradict with a study by Chan et al. (2016) they discovered that there was a high positive correlation between subjective norm and awareness of healthy eating habits among consumers. However, a study from Barrette and Feng (2021) concluded that individual personality traits and self-concept which relate to subjective norms have a significant influence on an individual's awareness of food contamination. This study shows that colleagues, teachers, neighbours, and parents are a key influence on an individual's awareness of food contamination. Therefore, the result of this study is accepted Hypothesis 2 predicted that subjective norm had a significant relationship with consumers' awareness towards contaminated peanut based-products in Terengganu.

4.3.1.3 The Relationship between Perceived Behavioral Control with consumers' awareness towards contaminated peanut based-products in Terengganu

From Table 4.14, the correlation coefficient between perceived behavioral control with consumers' awareness towards contaminated peanut based-products in Terengganu was positive significant at (r=0.452, p=0.000). The rule of thumb shows that perceived behavioral control for interpreting the size of correlation coefficient was a low positive correlation between perceived behavioral control with consumers' awareness towards contaminated peanut based-products in Terengganu at 0.452 level.

Similarly, in the previous study by Psouni et al. (2016), there was a significant at 0.812 level between perceived behavioural control in consuming contaminated food products with awareness towards consuming food products. A study from Harrison (2012), stated that there was a high positive correlation between the ability to control hygienic consumer behaviour in purchasing contaminated peanut-based products with awareness towards a contaminated peanut-based product. A previous study supports the statement which is they concluded that there was a high positive correlation between perceived behavioral control with awareness toward healthy eating (Backman et al. 2002; Gronhoj et al. 2013; Chan et al. 2016). The result of this study is accepted Hypothesis 3 predicted that subjective norm has a significant relationship with consumers' awareness towards contaminated peanut based-products in Terengganu.

4.3.1.4 The Relationship between Knowledge with consumers' awareness towards contaminated peanut based-products in Terengganu

The correlation coefficient between knowledge with consumers' awareness towards contaminated peanut based-products in Terengganu is not significant (r=0.187, p=0.22). Table 4.13 indicate that, significant (2-tailed) between knowledge and awareness was 0.022 level which are more than 0.01. The Rule of thumb in Table 4.13 also shows that the size of correlation coefficient was a negligible correlation between knowledge with consumers' awareness towards contaminated peanut based-products in Terengganu.

The result does not engage with Toma (2019), he carried out that, there was a significant correlation between knowledge and level of awareness in eating healthy food. This is consistent with the findings of the study from Toh and Birchenough (2017), there was a significant relationship between knowledge of consumers towards contaminated food with consumers' awareness towards food products. Surveys such as that conducted by Hassan et al. (2018), showed that there was a significant correlation coefficient at 0.823 level between knowledge and awareness and have a high positive correlation. Hypothesis 4 that predicted knowledge has a significant relationship with consumers' awareness towards contaminated peanut based-products in Terengganu was rejected by the results of correlation analysis as shown in Table 4.14.

Table 4.14: The Spearman's Correlation Analysis

Correlations

			Awareness	Attitude	Subjective norm	pbc	knowledge
Spearman's rho	Awareness	Correlation Coefficient	1.000	.397**	.420**	.452**	.187
		Sig. (2-tailed)	.	.000	.000	.000	.022
		N	150	150	150	150	150
	Attitude	Correlation Coefficient	.397**	1.000	.362**	.221**	.314**
		Sig. (2-tailed)	.000	.	.000	.007	.000
		N	150	150	150	150	150
	Subjective norm	Correlation Coefficient	.420**	.362**	1.000	.467**	.233**
		Sig. (2-tailed)	.000	.000	.	.000	.004
		N	150	150	150	150	150
	pbc	Correlation Coefficient	.452**	.221**	.467**	1.000	-.035
		Sig. (2-tailed)	.000	.007	.000	.	.672
		N	150	150	150	150	150
	knowledge	Correlation Coefficient	.187	.314**	.233**	-.035	1.000
		Sig. (2-tailed)	.022	.000	.004	.672	.
		N	150	150	150	150	150

**. Correlation is significant at the 0.01 level (2-tailed).

4.4 Summary

From this study, by using the Theory of Planned Behavior (TPB) and Knowledge, Attitude, Practice (KAP) model the results showed that the variables which are attitude, subjective norm, and perceived behavioral control had significant values while knowledge was not significant. It shows that TPB and KAP model is an effective theory and model to use which can estimate consumers' awareness towards contaminated peanut based-products.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.0 Conclusion

There are three objectives to this study. The first objective is to determine the level of consumers' awareness towards contaminated peanut-based products in Terengganu. The second objective is to identify the level of knowledge, attitudes, subjective norm, and perceived behavioural control of consumers' awareness towards contaminated peanut-based products in Terengganu. The third objective is to analyse the relationship between knowledge, attitudes, subjective norm, and perceived behavioural control on consumers' awareness towards contaminated peanut-based products in Terengganu. All of the study's objectives had been achieved.

The result was analysed using descriptive statistics, referring to the mean score of awareness, knowledge, attitude, subjective norm, and perceived behavioural control toward consumers eating peanut-based products in Terengganu. The mean score of awareness was a medium mean score (M=3.5778). It is the same with the result of the mean score of perceived behavioral control which is the mean score also medium (M=3.2648). For the variables of attitude, and subjective norm there was a high mean score which is attitude (M=4.1029), and subjective norm (M=3.7781). The results of knowledge were adequate knowledge and the mean score was (M= 2.4783).

To analyse the relationship between consumers' awareness with knowledge, attitude, subjective norm, and perceived behavioral, this study was used the Spearmen correlation. The result shows that all the variables have a significant correlation except knowledge.

5.1 Recommendations

Some recommendations would be made based on the objective, results, and conclusions to improve future research work. Based on the results of level awareness from this study was moderate. From that, to increase the level of awareness towards contaminated peanut-based products, the government and non-governmental organizations (NGOs) should launch campaigns to increase the consumers' awareness. This is because consumers normally take for granted the hazard risks, while completely ignoring the issues of food contamination. Furthermore, manufacturers must take action to address the issue of contaminated peanut-based products by implementing HACCP guidelines. They must also ensure that their products have important logos such as Halal, expiry date, ingredients, and Good Manufacturing Practices (GMP) for consumers to gain knowledge on product information. Manufacturers as the primary component in production can undoubtedly control product safety and quality. Other than that, I would like to suggest this research can also be expanded to other states in Malaysia or the entire country to improve the study's significance to determine the level of consumers' awareness towards a contaminated peanut-based product

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APPENDIX

UNIVERSITI MALAYSIA KELANTAN

CONSUMER'S AWARENESS TOWARDS CONTAMINATED PEANUT-BASED PRODUCTS IN TERENGGANU

KESEDARAN PENGGUNA TERHADAP PRODUK BERASASKAN KACANG TANAH DI TERENGGANU

Dear respondents:

1) **This research is to:**
   - i. **To determine the level of consumers' awareness towards contaminated peanut-based products in Terengganu.**
   - ii. **Identify level of knowledge, attitudes, subjective norm and perceived behavioural control of consumers' awareness towards contaminated peanut-based products in Terengganu.**
   - iii. **Analyse relationship between knowledge, attitudes, subjective norm and perceived behavioural control on consumers' awareness towards contaminated peanut-based products in Terengganu.**
2) **Please answer all questions.**
3) **Thank you for your cooperation and information given.**

Kepada responden:

1) *Kajian ini adalah untuk:*
   - i. *Untuk mengetahui tahap kesedaran pengguna terhadap produk berasaskan kacang tanah yang tercemar di Terengganu.*
   - ii. *Mengenal pasti tahap pengetahuan, sikap, norma subjektif dan kawalan tingkah laku yang dirasakan kesedaran pengguna terhadap produk berasaskan kacang tanah yang tercemar di Terengganu.*

Menganalisis hubungan antara pengetahuan, sikap, norma subjektif dan kawalan tingkah laku yang dirasakan terhadap kesedaran pengguna terhadap produk berasaskan kacang tanah yang tercemar di Terengganu

2) *Sila jawab semua soalan.*
3) *Terima kasih di atas kerjasama dan maklumat yang berikan.*

QUESTIONAIRE/ SOAL SELIDIK

***SECTION A: DEMOGRAPHIC INFORMATION*/BAHAGIAN A: MAKLUMAT DEMOGRAFI**

Please tick (/) in the appropriated box to indicate your answer.

Sila tandakan (/) dalam kotak yang diperuntukkan untuk menunjukkan jawapan anda.

1	***Gender*** /Jantina	□ ***Male*** /Lelaki □ ***Female*** /Perempuan
2	***Age*** /Umur	----------years old
3	***Education Level***/Peringkat pendidikan	□ ***Not going to school*** /Tidak bersekolah □ UPSR □ SRP/SPM □ ***Technical Certificate***/Sijil Kemahiran □ STPM.STAM □ Diploma □ ***Degree/Master/PhD*** (Ijazah/Sarjana/PhD)
4	***Race*** /Bangsa	□ ***Malay*** /Melayu □ ***Chinese*** /Cina □ ***Indian*** /india □ Others, please state /lain, sila nyatakan:----------
5	***Income***/Pendapatan	***RM***…….
6	***How often you eat peanuts***/Berapa kerap anda makan kacang tanah	□ ***Never***/Tidak pernah □ ***Less than once a month***/Kurang dari sekali sebulan □ ***1-2 times a month***/1-2 kali sebulan □ ***Once a week***/Seminggu sekali □ ***1-2 times a week***/1-2 kali seminggu

Instruction: For statement on SECTION B, D and E please read for each item and indicate your answer between one (1) to five (5). Your score (1) would indicate you strongly disagree with the statement and score (5) would indicate you strongly agree with respective statement.

(Arahan: untuk kenyataan di Bahagian B, C, D dan E Sila baca setiap soalan dan nyatakan jawapan anda antara satu (1) hingga lima (5). Skor anda (1) akan menyatakan anda tidak bersetuju dengan kenyataan dan skor (5) akan menyatakan anda bersetuju dengan penyata berkenaan)

***Please indicate your response by select the answer to the following statements* (Sila tandakan jawapan anda pada kenyataan yang diberikan)**

STRONGLY DISAGREE **(Sangat tidak setuju)**	***DISAGREE*** **(Tidak setuju)**	***NEITHER AGREE OR NOT*** **(Sama ada setuju atau tidak)**	***AGREE*** **(Setuju)**	***STRONGLY AGREE*** **(Sangat setuju)**
1	**2**	**3**	**4**	**5**

SECTION B: CONSUMER'S AWARENESS TOWARDS CONTAMINATED PEANUT BASED PRODUCT

Each statement below represents the consumer's awareness towards contaminated peanut based product in Terengganu.

Setiap kenyataan di bawah mewakili kesedaran pengguna terhadap produk berasaskan kacang tanah di Terengganu.

	In my opinion/Pada pendapat saya	1	2	3	4	5
1	***Awareness towards contaminated peanut based product can prevent me from food poisoning*** Kesedaran terhadap produk berasaskan kacang tanah yang tercemar dapat mengelakkan saya dari keracunan makanan					
2	***Awareness towards contaminated peanut based product is important for me*** Kesedaran terhadap produk berasaskan kacang tanah yang tercemar penting untuk saya					
3	***Awareness about food contaminated can influence me to choose food intake that free from contamination*** Kesedaran tentang makanan tercemar dapat mempengaruhi saya untuk memilih pengambilan makanan yang bebas dari pencemaran					
4	***Food contamination are serious issues*** Pencemaran makanan adalah masalah serius					
5	***Peanuts contamination are serious issues*** Pencemaran kacang tanah adalah masalah serius					
6	***Food contamination can occur in peanut-based product*** Pencemaran makanan boleh berlaku pada produk berasaskan kacang tanah					

SECTION C: KNOWLEDGE

Each statement below represents knowledge of consumers towards contaminated peanut based product.

Setiap kenyataan di bawah melambangkan pengetahuan pengguna terhadap pencemaran produk makanan berasaskan kacang tanah.

Instruction: For statement on SECTION C please read for each item and indicate your answer between one (1) to five (3). These questions were created based on statements about the knowledge of contaminated peanut-based products No=1, Not Sure=2 and Yes=3.

(Arahan: untuk kenyataan di Bahagian C sila baca setiap soalan dan nyatakan jawapan anda antara satu (1) hingga lima (3). Soalan-soalan ini dibuat berdasarkan pernyataan mengenai pengetahuan mengenai produk berasaskan kacang tanah yang tercemar Tidak = 1, Tidak Pasti = 2 dan Ya = 3)

	In my opinion/Pada pendapat saya	1	2	3
1	***Poor storage conditions will promote the presence of aflatoxins in peanuts based product*** Keadaan penyimpanan yang buruk akan mendorong kehadiran aflatoksin dalam produk berasaskan kacang tanah			
2	***Aflatoxin exposure from peanuts can be controlled and reduced by visually checking nuts for moldy-looking, discolored, or shriveled*** Pendedahan aflatoksin dari kacang tanah dapat dikawal dan dikurangkan dengan memeriksa kacang secara visual untuk melihat kulat, berubah warna, atau mengerut			
3	***Intake of peanuts that contains aflatoxins have adverse health implications*** Pengambilan kacang tanah yang mengandungi aflatoksin mempunyai implikasi buruk terhadap kesihatan			
4	***Processed peanuts products exposes peanuts to oxygen and can promote presence of mould*** Produk kacang yang diproses dapat mendedahkan kacang tanah kepada oksigen dan dapat menarik kehadiran kulat			

5	***The frequency of aflatoxins contamination is higher in processed peanut products than in raw peanuts in their shells*** Kekerapan pencemaran aflatoksin lebih tinggi pada produk kacang yang diproses daripada kacang mentah di kulitnya			
6	***Peanuts products like "roasted peanut", "peanut butter", and "peanut cookies" are easily contain aflatoxins*** Produk kacang tanah seperti "kacang panggang","mentega kacang", dan "biskut kacang" mudah mengandungi aflatoksin			
7	***Mould growth in peanut based products are easily contain aflatoxins*** Pertumbuhan kulat dalam produk berasaskan kacang tanah mudah mengandungi aflatoksin			
8	***Precaution must be taken to not intake peanuts that show any sign of damage or mould growth.*** Langkah berjaga-jaga harus diambil agar tidak mengambil kacang yang menunjukkan tanda-tanda kerosakan atau pertumbuhan kulat			

SECTION D: ATTITUDE

Each statement below represents attitude of consumers towards contaminated peanut based product.

Setiap kenyataan di bawah melambangkan sikap pengguna terhadap pencemaran produk makanan berasaskan kacang tanah.

	In my opinion/Pada pendapat saya	1	2	3	4	5
1	***I am aware of words "nuts" on food label*** Saya sedar tentang perkataan "kacang" dalam label makanan.					
2	***I am aware about contaminated in peanut-based product*** Saya sedar tentang pencemaran makanan berasaskan kacang tanah					
3	***I learn that peanut easily to contaminated*** Saya belajar bahawa kacang tanah senang tercemar					
4	***I believe that eating peanut are healthy*** Saya percaya bahawa makan kacang tanah ialah sihat					
5	***I am aware of eating peanut have high risk towards food contamination*** Saya sedar makan kacang tanah mempunyai risiko tinggi terhadap pencemaran makanan					
6	***I believe that eating contaminated peanut can give adverse health*** Saya percaya yang kacang tanah yang tercemar dapat beri kesihatan buruk					
7	***I know peanuts that loose-shelled, damaged, and under sized kernels is possible presence of mould*** Saya tahu kacang yang mempunyai kerang longgar, rosak, dan di bawah saiz adalah kemungkinan wujudnya kulat					

SECTION E: SUBJECTIVE NORM

Each statement below represents subjective norm of consumers towards contaminated peanut based product.

Setiap kenyataan di bawah mewakili norma subjektif pengguna terhadap pencemaran produk makanan berasaskan kacang tanah.

	In my opinion/Pada pendapat saya	1	2	3	4	5
1	***My family members who influenced me to eat peanuts*** Ahli keluarga saya yang mempengaruhi saya untuk makan kacang tanah					
2	***My surrounding community who influenced me to eat peanuts*** Orang sekeliling saya mempengaruhi saya untuk makan kacang					
3	***Media information such as (Facebook, Twitter, WhatsApp, etc.) encourage me to known about contaminated peanuts-based product*** Maklumat media seperti (Facebook, Twitter, WhatsApp, etc.) menggalakkan saya untuk mengetahui tentang pencemaran produk berasaskan kacang					
4	***My family members influenced me that food which not exposed to contaminated is important for health*** Ahli keluarga saya mempengaruhi saya bahawa makanan yang tidak terkena pencemaran adalah penting untuk kesihatan					
5	***Learning from school can help me to aware about food contamination*** Pembelajaran di sekolah membantu saya untuk sedar tentang pencemaran makanan					
6	***The government provide programmes about the awareness of contaminated peanut-based product*** Kerajaan menyediakan program mengenai kesedaran tentang produk berasaskan kacang tanah yang tercemar					

SECTION F: PERCEIVED BEHAVIOURAL CONTROL

Each statement below represents of perceived behavioural control of consumers towards contaminated peanut based product.

Setiap kenyataan di bawah mewakili kawalan tingkah laku pengguna terhadap pencemaran produk makanan berasaskan kacang tanah.

	In my opinion/Pada pendapat saya	1	2	3	4	5
1	***It is easy for me to get awareness towards contaminated peanut-based product*** Ia mudah bagi saya untuk mendapat kesedaran terhadap produk berasaskan kacang yang tercemar					
2	***I have enough awareness about contamination of aflatoxin in peanut based product*** Mempunyai kesedaran mengenai pencemaran aflatoksin dalam produk berasaskan kacang tanah					
3	***It easy for me to get information about contaminated peanut-based product*** Mudah bagi saya untuk mendapatkan maklumat tentang produk berasaskan kacang tanah yang tercemar					
4	***I have enough awareness and information about contaminated peanut-based product*** Saya mempunyai kesedaran dan maklumat yang cukup mengenai produk berasaskan kacang tanah					
5	***I am knowledgeable about food contamination*** Saya berpengetahuan mengenai pencemaran makanan					
6	***I am familiar with the issues of peanut contamination*** Saya biasa dengan isu pencemaran kacang tanah					